

literary evidence is possible of iron being earlier in India than in Europe, as the oldest works, the Vedas, are, in their present form, centuries later than iron was known in Europe. So far as internal evidence goes the copper axes are closely like those of the copper age in Italy, while the iron tools have much affinity with those of the Roman period. Thus, in the absence of any evidence of position, we are thrown back on the suggestion that the iron is later than that of Europe, and succeeded the use of copper. That stone tools continued in use until iron was made, and so are found contemporaneously with it, is what is known in other countries where copper and bronze long preceded iron, without ousting the use of stone.

It will be seen, then, how the whole basis of Indian prehistory needs clearing up and defining by strict evidence fully recorded. In a land where the wealth of historic buildings far exceeds the provision for archaeology, it is a reproach to the Government and not to the archaeologist that the prehistory is left unsettled. We need first a firm basis of record of all that is contemporary with finds of Roman coins and early buildings, and before that a series of stages of groups (linked together by their resemblances in pottery, stone, and metal work) which could be projected one beyond the other into the unknown.

Some details will be of general interest. The palæolithic tools are of quartzite, the neolithic of traprock (p. 17). There are no perforated celts (p. 18). The stone axes are set through wooden handles, secured from splitting by iron ferrules (plate, p. 60). Amazon stone is found in veins in granite (p. 23), as in the Egyptian source, the site of which is unknown. W. M. F. P.

WOMEN AND THE LAND.

Women and the Land. By Viscountess Wolseley. Pp. xi+230. (London: Chatto and Windus, 1916.) Price 5s. net.

ONE of the characteristic features of the nineteenth century was the movement from the country to the city, and now in the twentieth century the process is being reversed, and there is a strong tendency to move back once more to the land. As yet it is only in the tentative stages; people go out into the country to retire, to keep a poultry farm, or to set up a fruit farm, and there is much to be learned, and still more to be done, before the movement becomes sufficiently well organised to make it a really potent factor in the national life. It is quite clear that women must take part in it, and perhaps the most notable feature in the whole business is the way in which they are organising themselves for the purpose. We may take it that, once being organised for the exodus, they are not likely to disorganise for the settlement, and the new rural community will therefore be very different from the old. The basis of the women's organisation is educational, and therein it differs from the ordinary man's "back to the land" movement, the basis of which is mainly political. It is this that makes it so full of portent for the future.

NO. 2433, VOL. 97]

Having found the agricultural colleges, with one or two exceptions, barred against them, some of the more enterprising and far-seeing spirits proceeded to set up colleges of their own. Amongst them is Lady Wolseley, who founded the institution at Glynde some fourteen years ago, and in the book before us she sets out the results of her experience and makes various suggestions for the future.

Lady Wolseley does not contemplate that women shall be the labourers, but rather the leaders, in the new community. She considers them well fitted for two classes of work: supervisory or advisory work for educated women belonging to the middle and upper classes; and light manual work connected with the dairy, poultry, bees, fruit, the house, etc., for the village girl. Facilities for training the advisers already exist, but little has yet been done towards teaching the more manual work.

The author maintains, however, that it is not sufficient merely to turn women into the country; some sort of common tie must be kept up, and for this purpose the best arrangement is considered to be a colony on co-operative lines, where it would be possible not only to make good business arrangements for buying and selling materials, produce, etc., but where also opportunities for social life would be afforded. The details are discussed in successive chapters. The most striking feature of the book is the seriousness with which the whole subject is taken, and the clear recognition that a second education is the only sure basis for success. E. J. R.

OUR BOOKSHELF.

The Chemists' Year-book, 1916. Edited by F. W. Attack. Vol. i., pp. 354. Vol. ii., pp. 355-990. (London and Manchester: Sherratt and Hughes, 1916.) Price 10s. 6d. net.

THIS handy book belongs to a type of chemical literature which is more common in Germany than with us. Such examples of it as we have hitherto possessed have been mainly translations from the German, and have been prepared for simultaneous issue in both countries, usually at the beginning of each year. Almanacs and year-books are common enough in all grades of business, but it is only within recent years that they have been adapted to the requirements of professional chemistry. They are essentially designed to meet the wants of practising chemists and public analysts, to whom it is a great convenience to have numerical tables, mathematical constants, and useful memoranda arranged for them in a handy and easily accessible form.

Mr. Attack's compilation is a much more comprehensive production than is usual in a work of this kind, and includes quite a remarkable body of information ranging from a list of notable dates in the history of chemistry to the pharmaceutical names of synthetic compounds and trade names of drugs, together with analytical tables, conversion tables for weights and measures, five-figure

logarithms, natural sines and tangents, specific gravity and hydrometric tables, and tables of solubilities of a wide range of substances. As a rule, care has been shown in selecting the latest and best authorities, and the whole has been put together in a convenient form. The proofs have evidently been very well read, as the book is remarkably free from typographical errors. The editor deserves great praise for the thoroughness with which he has done his work, and the book, we trust, will find a place in the laboratory or on the desk of every chemical consultant.

The Purpose of Education: An Examination of the Education Problem in the Light of Recent Psychological Research. By St. George Lane Fox Pitt. New Edition. Pp. xxviii+144. (Cambridge: At the University Press, 1916.) Price 2s. 6d. net.

Few people, it is to be feared, even among teachers, ever really face the question: "What ought education to aim at?" This book will at least stimulate to such inquiry, and it points the way in the right direction. The author, accepting the new conception of human personality which psychical research has brought about, considers that the proper purpose of education is the harmonising of psychic phases, the study of the laws governing them, finding their interpretation in the art of living and "giving them synthetic expression in the growth of character." To put the matter in definite form, the manufacture of noble souls is the right aim, and the right method is the inculcation of high ideals. The Sermon on the Mount is the acme of truth and beauty. It urges us to rely less on the seen, the concrete, the physically tangible, and more on the spiritual side of our natures, unmanifest to our senses, but very real and permanent, eternal while the other is temporal. Thus we gain true security and everlasting peace. The present state of Serbia, Poland, and Belgium shows what is the result when education in a neighbour-State becomes materialistic, aiming only at physical efficiency and power. The war has its lessons: we must learn them.

LETTERS TO THE EDITOR.

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Gravitation and Temperature.

As the outcome of a very delicate systematic series of experiments (*Phil. Trans.*, 1916) it is announced by Dr. P. E. Shaw that "when one large mass attracts a small one the gravitative force between them increases by about $1/500$ as temperature of the large mass rises from, say, 15°C. to 215°C. "; that is, it increases by about 1.2×10^{-5} of itself per degree Centigrade. This seems to be a very startling result, at any rate if temperature is merely the expression of internal molecular motions, as, indeed, Dr. Shaw seems to admit.

By Newton's principle gravitation between masses

must act reciprocally; the result, therefore, means that the astronomical mass of a body must increase with temperature by 1.2×10^{-5} of itself per degree Centigrade. The pendulum experiments of Bessel and recent determinations by Eötvös seem to establish proportionality between gravitational mass and mass of inertia, irrespective of temperature, well beyond these limits. Thus inertia also would have to increase with temperature; and when a freely moving mass is becoming warmer its velocity must be diminishing, for its momentum must be conserved. A comet like Halley's is heated upon approach to the sun; thus it should suffer retardation in the approaching, and acceleration in the receding, part of the orbit, enough probably to upset existing astronomical verifications. Indeed, as regards change of inertia, we can recall the principle applied by Prof. Joly to the question whether chemical change involves change of mass, viz., that every mass around us is moving through space with the velocity of the solar system, and a sudden rise of temperature in a body must therefore involve a violent kick if its inertia is thereby sensibly altered.

Electrodynamic theory does establish unequivocally an increase of inertia of a body arising from gain (δE) of thermal or electric energy; but this is only of amount $\delta E/c^2$, where c is the velocity of radiation, and so is minute beyond detection. The question whether there is also an equivalent increase in gravitational mass evades discussion until some link connecting gravitative and electric forces has been established.

J. L.

Cambridge, June 5.

A Plague of Caterpillars.

WITH reference to what has appeared in the public Press relative to the devastation caused by caterpillars to the oak trees at Ashted, you may be interested to know that some three or four years since a similar occurrence took place in the oak plantations in Richmond Park.

The denudation of the trees was so severe that in the spring of 1913 H.M. Office of Works consulted Mr. Maxwell Lefroy, the famous entomologist of the Royal College of Science, with the view of stamping out the pest. Eventually it was decided to spray the trees with chromate of lead at such a time that the young caterpillars, on hatching out, should have only poisoned food. The spraying operations were carried out by portable high-pressure pumping apparatus loaned by myself, self-supporting telescopic ladders being provided to reach the tree-tops some 40 ft. from the ground.

This was, I believe, the first occasion on which attempts were made to spray such large trees, and there is not much doubt that the oaks at Ashted could be treated in a similar manner.

It is, of course, now too late in the season to undertake preventive measures, but if spraying were undertaken early next May I have not much doubt that the pest could be eradicated.

J. COMPTON MERRYWEATHER.

4 Whitehall Court, S.W., June 7.

The Black-eared Wheatear: A New Bird for the Irish List.

ORNITHOLOGICAL readers of NATURE will no doubt be interested to learn that a black-eared wheatear (*Oenanthe hispanica*) was obtained on Tuskar Rock, Co. Wexford, on May 16, by Mr. Glanville, principal lightkeeper. There are two races of this bird, an Eastern and a Western, each of which exhibits dimorphism of plumage, the